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ABSTRACT

This pamphlet presents brief reviews of 38 population education software and online systems currently available. It includes mathematical models, simulations, databases, problem-solving games, online systems, and associations. The review includes a description of the program, the level at which it is aimed, required computer hardware, the vendor's address and telephone number, and cost. (KR)

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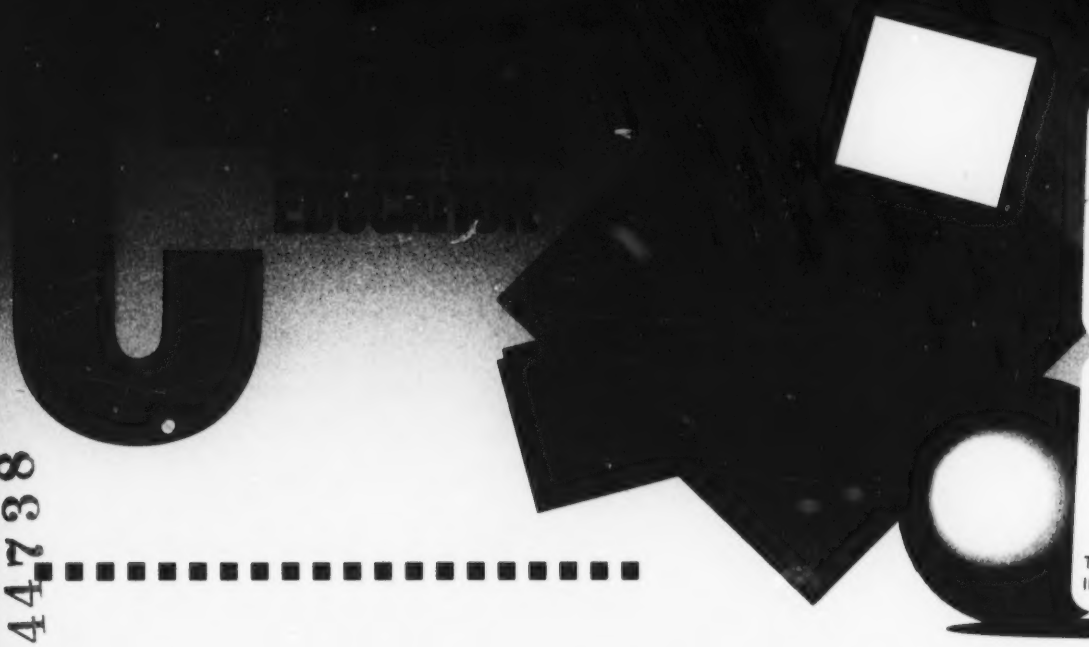

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Computers are valuable tools for teaching about population dynamics and their impacts. Because they can perform complex calculations quickly, they allow students to easily manipulate variables and observe how different factors influence population change. Because computers can store, sort, and locate data quickly, they can be very efficient research aids. And because they can be programmed to accommodate many possible choices by the user, they can serve as valuable teachers' aids for instructional, problem-solving games.

Following are brief reviews of some population education software and online systems currently available.

ATHEMATICAL MODELS

BASICS IN FORECASTING: POPULATION AND ECONOMIC MODELS

Basics in Forecasting is designed to introduce students to "the art and science of computer modeling." The software and accompanying manual present several economic and population models that may be used in forecasting future trends. With the national data supplied for the U.S., students can run the models to see how they work. For most models, data is displayed numerically in a chart and graphically, with a line or bar graph. *Basics in Forecasting* also enables users to input data for individual states and thereby make comparable forecasts on the state level. Manipulating data in using these models, with the guidance of the manual, students learn the strengths and weaknesses of computer modeling and learn some strategies to refine modeling techniques to increase the likelihood of accuracy in forecasting. It is essential for students to use the manual along with the software to fully understand the modeling techniques.

COLLEGE LEVEL; IBM PC, PS/2 REQUIRED; 192K REQUIRED; CGA REQUIRED; USER'S MANUAL INCLUDED; NO PRINT CAPABILITY; 2 (5¼") DISKS INCLUDED; 1 DISK DRIVE REQUIRED

VENDOR : CONDUIT, The University of Iowa, Oakdale Campus, Iowa City, Iowa 52242; 319-335-4100; 800-365-9774; $80.00

COEXIST: POPULATION DYNAMICS

Coexist offers a model for investigating factors that affect population change in an environment with limited resources. Students can examine a single species in such an environment or look at two different species competing for limited resources. For each group examined, the student

specifies initial population size, the maximum population the environment could support (carrying capacity), average number of offspring, time between generations, and length of time he wishes to "observe" the growth of the population, which is plotted on a line graph.

When investigating competition between two species, the student also specifies the value of the inhibitory factor, i.e., the detrimental effect each species has on the other. The model used is based on Gause's Competitive Exclusion Principle that when two species make the same demands on limited resources, one will inevitably come to dominate the niche to the exclusion of the other.

Student leaflets explain growth curves, principles of competitive exclusion, and mathematical models, and suggest questions to answer using the software. Instructor's notes offer a teaching scheme for using *Coexist* and explain the outcomes of the exercises suggested in the student leaflets.

SECONDARY, COLLEGE (BIOLOGY) LEVEL; APPLE II+, IIC, IIE REQUIRED; 48K REQUIRED; NO CGA, EGA, OR VGA REQUIRED; INSTRUCTOR'S NOTES, STUDENT LEAFLETS INCLUDED; NO PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDOR: CONDUIT, University of Iowa, Oakdale Campus, Iowa City, Iowa 52242; 319-335-4100; 800-365-9774; $55.00

DEMO-GRAPHICS

Students can examine population change in any of 144 countries in the database provided, or input their own data to update the database or add new countries. They can use actual recent demographic data (preprogrammed) or state their own specifications for total fertility rate, age-specific fertility rates, age-specific mortality rates, total population, life expectancy, infant and child mortality rates, or age structure. Students can then see the country's population pyramids projected for five-year intervals for a 50-year period. Two countries' pyramids can be displayed on the same graph, for comparison.

Students can also plot a line graph of one or more factors: total population, age groups, birth rate, death rate, percent increase in population per year, total fertility rate, life expectancy at birth, dependency ratio, and doubling time. They can examine one or two countries' data at a time and display projections beginning with 1975 and running 20-200 years into the future, at five-year intervals.

SECONDARY, COLLEGE (SOCIOLOGY, DEMOGRAPHY, GEOGRAPHY) LEVEL; IBM PC, APPLE SERIES REQUIRED; 128K (IBM), 48K (APPLE) REQUIRED; CGA REQUIRED; USER'S MANUAL INCLUDED; NO PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS:

CONDUIT, University of Iowa, Oakdale Campus, Iowa City, Iowa 52242; 800-365-9774; $95.00

QUEUE, 562 Boston Avenue, Bridgeport, Connecticut 06610; 800-232-2224; 203-335-0908; $90.00

EASWESPOP: FERTILITY ESTIMATE PROGRAMS

Five methods of estimating fertility are included in this software (P/F Ratio Method, Parity Increment Method, Rele's Method, Palmore's Regression Method, and the Own-children Method). Designed for population researchers, the software requires the user to input a whole range of fertility data in order to derive tables which show such statistics as average parities, cumulated fertility, total fertility, fertility rates for conventional age groups, etc. Strong mathematical skills are required to fully understand how each method works.

COLLEGE LEVEL; IBM PC REQUIRED; 256K REQUIRED; NO CGA, EGA, OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDOR: EAST-WEST CENTER, East-West Population Institute, 1777 East-West Road, Honolulu, Hawaii 96848; 808-944-7111; $10.00

FUTure POPulation

FUTPOP uses the cohort-component technique to calculate population projections and occurrence projections for age/sex related events such as crime, disease prevalence, school attendance, etc. By providing estimates for current population size and future fertility, mortality, migration and event prevalence, *FUTPOP* can calculate results in either absolute or percent distributions in one of three formats: all information for each year; as a year-by-year series for a single item; or an annual pyramid.

The student supplies ACSII input files descibing current estimates of population size and structure, future fertility, mortality and migration rates. The program includes sample input files for Iran, Egypt and the United States, but the student is encouraged to construct his or her own.

Because *FUTPOP* was originally designed for professional applications, the software may be best suited for mathematically or demographically inclined upper-level students, as the calculations entail an understanding of statistics and calculus.

SECONDARY, COLLEGE LEVEL; IBM PC REQUIRED; 512K REQUIRED; NO CGA, EGA, OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 2 DISK DRIVES REQUIRED

VENDOR: NATIONAL COLLEGIATE SOFTWARE CLEARINGHOUSE, School of Humanities and Social Sciences, North Carolina State University, Box 8101, Raleigh, North Carolina 27695; 919-684-6837; $49.95

HUMAN POPULATION GROWTH

Human Population Growth contains two modules: *Demog1* and *Demog2*.

Printed on Recycled Paper

In *Demog1*, students may select any of ten countries and have the software calculate 50-year future projections of the population level based on the crude birth and death rates of a base year. Students can also change the birth rate and/or death rate at five-year intervals and observe the effects on the population total and the growth rate. Resulting data for five-year intervals are charted and then plotted on a line graph. The growth curves resulting from two different sets of variables can also be displayed on the same graph, for contrast.

In *Demog2*, students choose one of six countries for which recent data are provided, or work with data they input themselves on up to three more countries, and see a display of the country's "population pyramid," a bar graph of age-sex structure. A specific five-year age cohort can be highlighted as projected future pyramids, at five-year intervals, are displayed. Also, an outline of one pyramid can be superimposed on another for comparison.

SECONDARY LEVEL; BBC 3802/4802, APPLE SERIES REQUIRED; TEACHERS' GUIDE, STUDENT LEAFLETS AND WORKSHEETS INCLUDED; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED; OTHER TECHNICAL INFORMATION NOT AVAILABLE

VENDOR: LONGMAN GROUP LTD., Longman House, Burnt Mill, Harlow, Essex CM20 2JE, United Kingdom; 15.95 £ + VAT

MALTHUS

This software offers a Malthusian computer model of world population growth and its relationship to food supplies and nonrenewable energy resources. Using 1980 values for birth rate, death rate, percentage of land under cultivation, reserves of oil, and diet (animal proteins vs. crop foods), the model demonstrates the population growth that would result if these values were to remain the same for 300 years. The levels of population, food resources, and oil reserves are plotted on a graph at five-year intervals, and numeric values are simultaneously displayed next to the graph. The model can also be run with values from 1900, allowing students to see that if these values had remained unchanged, today's population level would be quite different.

Students can alter the values of any or all five variables and run the demonstration again. After 50 years are graphed and displayed, the values may again be altered, or the demonstration may be continued using the same values for another 50 years. This process continues up to a 300-year period. Unfortunately, the demonstration runs very slowly, and once it begins, the user cannot change its pace or end it until at least a 50-year interval is demonstrated. This can be frustrating and a serious drawback.

SECONDARY LEVEL; APPLE SERIES REQUIRED; 48K REQUIRED; NO CGA, EGA, OR VGA REQUIRED; STUDENT HANDOUTS AND TEACHER'S GUIDE INCLUDED; NO PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS:

SOCIAL STUDIES SCHOOL SERVICE, 10200 Jefferson Boulevard, Post Office Box 802, Culver City, California 90232-0802; 800-421-4246; 213-839-2436; $49.95

QUEUE, INC., 338 Commerce Drive, Fairfield, Connecticut 06430; 800-232-2224; 203-335-0908; $39.95

CHATQUASOFT, Box 1280, 75 East Main, Ripley, New York 14775; 716-736-4100; $125.00

MORTPAK & MORTPAK-LITE

MORTPAK and *MORTPAK-LITE* are software packages for demographic measurement in developing countries, with special emphasis on mortality measurement. The 16 programs in each package include empirical and model life-table construction, graduation of mortality data, mortality and fertility estimation and evaluation of census coverage and age distribution.

MORTPAK-LITE is specifically designed for microcomputers. Companion software, *MORTPAK*, is constructed specifically for the the mainframe computer. The most important difference between the two packages is that the microcomputer version includes the worksheet-style, full-screen data entry procedure, whereas the mainframe version has batch-oriented data entry.

Due to the complex mathematics and demographic knowledge required, *MORTPAK* and *MORTPAK-LITE* are recommended primarily for college-level demographic studies.

COLLEGE AND POST-GRADUATE LEVEL; IBM PC REQUIRED; 384K REQUIRED; NO CGA, EGA, OR VGA REQUIRED, BUT REQUIRES MATH COPROCESSOR; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 3 DISKS INCLUDED; 2 DISK DRIVES REQUIRED

VENDOR: Population Division, Department of International, Economic and Social Affairs, UNITED NATIONS, New York, New York 10017; 212-963-3186; FREE

POPSHOW

Designed for introductory demography or self-instruction, this extensive collection of programs offers unlimited demographic information for both industrialized and developing countries. The eight, easy-to-use, menu-driven systems explain the basics of population dynamics, exploring such factors as fertility and mortality rates and comparing these factors for 50 countries. Others illustrate how population projections are calculated and explain various population models.

In several of the programs, students are presented with variable-intensive sample problems with which they can derive statistical data. They are then given the correct answers filled into the tables and graphs on the screen. A

strong background in mathematics is recommended. The user's manual provides a printed copy of the software's text.

SECONDARY, COLLEGE LEVEL; IBM PC REQUIRED; 256K REQUIRED; CGA, EGA, OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS :

GEORGE IMMERWAHR, Sociology Department DK-40, University of Washington, Seattle, Washington 98195; 206-543-5882; $10.00

NATIONAL COLLEGIATE SOFTWARE CLEARINGHOUSE, School of Humanities and Social Sciences, North Carolina State University, Box 8101, Raleigh, North Carolina 27695; 919-684-2173; $31.50

POPSIM: Population Simulation

This demographic forecasting software was originally designed for use in undergraduate courses and includes databases for over 60 countries. With user-supplied forecasts on ten factors for a given country, including population growth rate, migration, gross national product (GNP), gender ratio and energy consumption, *Popsim* provides both line and complex simulations for the output data. Three choices of printer output are offered: summary data listing all input data plus the total population at five-year intervals, per capita GNP and total energy use; age-specific populations by gender at five-year intervals and as percentages; and a population pyramid for any five-year period.

The software was designed specifically for use with a printer and a great deal of background information is necessary to supply the input variables. *Popsim* is probably best suited for upper-level students with a strong interest in demography or professional applications. Suggested topics for discussion are included in the user's manual.

COLLEGE LEVEL; IBM PC REQUIRED; 256K REQUIRED; NO CGA, EGA, OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDOR: NATIONAL COLLEGIATE SOFTWARE CLEARINGHOUSE, School of Humanities and Social Sciences, North Carolina State University, Box 8101, Raleigh, North Carolina 27695; 919-684-2173; $49.95

POPTRAN

Developed with funds from the United Kingdom Overseas Development Administration (ODA) and the United Nations Fund for Population Activities (UNFPA), *POPTRAN* is designed to train users in basic demographic statistics and population dynamics. Routines include: Population Pyramids, Population Projections, Population Dynamics, Population Policy, and Determinants of Fertility.
Using *Population Dynamics*, students are able to see what happens to population size, age structure and demographic indicators when fertility and mortality rates are changed. *Population Pyramids* uses the United Nations Assessment Data to display and compare population pyramids for nearly 200 countries. This same data enables students to make population projections for the next five to 100 years. Additionally, students can input levels of breastfeeding, contraception, abortion and age at first marriage to estimate total fertility rate. By manipulating these basic four proximate determinants, students can see just how much, for example, contraceptive use must increase in order to achieve replacement level fertility.

Although *POPTRAN* is primarily a training tool developed for career policymakers and planners, it can easily be used in the classroom to introduce students to population concepts and research.

SECONDARY, COLLEGE LEVEL; IBM PC REQUIRED; 512K REQUIRED; CGA, EGA, OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 5 (5¼") DISKS INCLUDED; 2 DISK DRIVES REQUIRED

VENDOR: Steve Kinzett, POPTRAN, Cardiff University Population Centre, University College, P.O. Box 78, Cardiff CF1 1XL U.K.; 50 £ + VAT

POPULATION CONCEPTS

The introduction to *Population Concepts* defines basic population concepts and illustrates them with lively graphics while allowing the student to control the pace of the presentation. The experimental mode offers three models, illustrating (1) exponential population growth, (2) exponential growth limited by carrying capacity, and (3) growth limited by carrying capacity and low breeding density. Using these models, students can vary specifications for initial population, reproductive rate, number of generations, carrying capacity, and breeding density, and observe the effects on population growth displayed in a table of data and plotted on a line graph. Student workbooks define terms and offer problems concerning populations of plants, animals and humans for students to solve using experimental models.

Population Concepts provides students with basic information on population dynamics without requiring strong mathematics skills. The experimental portion is not encumbered by equations or intimidating terminology, and exercises included in the student workbook clearly demonstrate how population models relate to real-life situations.

SECONDARY (BIOLOGY) LEVEL; APPLE II SERIES, TRS-80 MODELS III, 4, IBM PC REQUIRED; 64K or 48K REQUIRED; CGA REQUIRED; STUDY GUIDE AND 6 STUDENT WORKBOOKS INCLUDED; PRINT CAPABILITY; 2 (5¼") DISKS INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS: EDUCATIONAL MATERIALS AND EQUIPMENT, Old Mill Plain Road, P.O. Box 2805, Danbury, Connecticut 06813-2805; 203-798-2050; $47.00 (APPLE), $41.00 (TRS-80), $52.00 (IBM)

POPULATION GROWTH

Population Growth presents the concepts of intrinsic rate of natural increase, starting population, doubling time, and

carrying capacity, and offers two growth models for students to use. The geometric (exponential, J-curve) growth model is compared with the logistic (S-curve) model; the latter introduces the additional factor of carrying capacity.

Students can vary the starting population size, growth rate, and carrying capacity, and observe the effects as the resulting population growth rate is graphed. They can also use the "Curve Fitting" portion of the software to calculate growth rate and carrying capacity for a real population (e.g., one observed in a lab), for which they enter actual data.

Population Growth is well constructed in that it allows the student to work at his or her own pace, reviewing earlier lessons as needed, and encourages application of the software to actual lab data. It is very technical, however, and could overwhelm students who are not mathematically inclined. A strong background in algebra is recommended.

SECONDARY, COLLEGE LEVEL; APPLE II, IIE, IIC REQUIRED; 48K REQUIRED; NO CGA, EGA, OR VGA REQUIRED; USER'S NOTES INCLUDED; NO PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS :

CAROLINA BIOLOGICAL SUPPLY COMPANY, 2700 York Road, Burlington, North Carolina 27215; 800-334-5551; 919-584-0381; $75.00

CONDUIT, University of Iowa, Oakdale Campus, Iowa City, Iowa 52242; 800-365-9774; $55.00

QUEUE, INC., 338 Commerce Drive, Fairfield, Connecticut 06430; 800-232-2224; $60.00

POPULATION, HUMAN RESOURCES AND DEVELOPMENT TRAINING MODULE 1 (TM1)

This population projection software was developed for use by trainers in population, human resources and development planning training programs. Its main objective is to help nations incorporate demographic elements into employment-related policies and to aid in national development planning. The TM1 program simulates interactions between fertility, mortality, population growth, sex-age structure, and the effects of demographic trends and dynamics on labor supply and on education and health needs. It does require the user to input vital statistics for different countries.

Although the software was not expressly designed for classroom use, it would be useful for any curricula that relate population to economics and development. Users do not need knowledge of advanced mathematics or computer expertise to run this user-friendly, menu-driven system. The speed at which this software performs calculations is a plus. Projection tables, graphs and pyramids are produced instantaneously.

COLLEGE LEVEL; IBM PC REQUIRED; 256K REQUIRED; NO CGA, EGA, OR VGA REQUIRED; TRAINING MANUAL INCLUDED; NO PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 2 DISK DRIVES REQUIRED

VENDORS : INTERNATIONAL LABOUR OFFICE, Employment, Planning and Population Branch, CH1211 Geneva 22, Switzerland; FREE

POPULATION PYRAMIDS

Population Pyramids is an invaluable tool in teaching students how population pyramids are built and how they can be interpreted. The instructional menu begins students with basic information, answering the question, "What is a population pyramid?" After showing students how population pyramids are constructed, the software teaches how to interpret a pyramid's shape. Such examples as the present-day U.S., Mexico, Sweden, the U.S. during the baby boom and Germany after World War II are provided to show how pyramids are used to analyze time trends. *Population Pyramids* also explains how population projections are made and allows students to create pyramids from any data.

SECONDARY, COLLEGE LEVEL; IBM PC REQUIRED; 256K REQUIRED; NO CGA, EGA, OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY WITH ACCOMPANYING SOFTWARE, PPYRAMID; 1 (5¼") DISK INCLUDED; 1 DISK DRIVES REQUIRED

VENDORS: WISC-WARE, University of Wisconsin at Madison, 1210 West Dayton Street, Madison, Wisconsin 53706-1685; 800-543-3201; $75.00 (or $25.00 for members of WISC-WARE Consortium)

WHAT IF?

What If? consists of three segments covering population ecology, population immunity, and U.S. population growth over time.

In the *Population Ecology* segment, students can observe what happens to a deer population when they manipulate such variables as birth rate, death rate, immigration, emigration and percentage of females. The software calculates and charts the results on a spreadsheet format, and population changes can also be displayed on an arithmetic or semilog graph.

The *Population Immunity* segment also uses a spreadsheet chart and graphs to illustrate the growth of a cold virus in a human population. Students can vary six factors and observe the results, calculated by the software.

The U.S. *Population Growth* segment is quite different from the others and very engaging. It illustrates U.S. population growth from 1760 to 1980 by showing a new dot on a U.S. map (and sounding a beep) each time 200,000 people are added. This graphically demonstrates the increasing speed of population growth, the relative density of different areas, and the westward movement of the population's geographic center over time. Another simulation allows students to set the growth rate and observe projected future population growth as more dots appear on the map.

SECONDARY, COLLEGE (ECOLOGY, IMMUNITY, POPULATION) LEVEL; APPLE IIC, IIE REQUIRED; 64K REQUIRED; NO CGA, EGA, OR VGA

REQUIRED; INSTRUCTIONS, WORKSHEETS AND ANSWER SHEETS INCLUDED; PRINT CAPABILITY; 2 (5¼") DISKS INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS: PIKES PEAK SOFTWARE, 2740 Villa Loma Drive, Colorado Springs, Colorado 80917; 719-591-1781; $54.95

The following mathematical models were unavailable for review by ZPG, but can be ordered directly through the listed distributors:

LEXIS

LEXIS is graphics software that creates shaded contour surface maps depicting plotted data in three dimensions.

VENDOR: Publications Department, INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS, A-2361, Laxenburg, Austria; $15.00

LOTPAK

LOTPAK is a collection of demographic programs for LOTUS 1-2-3 developed by the University of Pennsylvania.

VENDOR: POPULATION STUDIES CENTER, University of Pennsylvania, 3718 Locust Walk, Philadelphia, Pennsylvania 19104; 215-898-5000; $10.00

POPSYN

POPSYN is a collection of over ninety different demographic programs covering mortality, fertility, nuptiality, migration, projections and modeling. *POPSYN* is capable of data input or import and can run re-programmed routines in LOTUS 1-2-3

VENDOR: GARCIA-BOGUE RESEARCH AND DEVELOPMENT, LTD., P.O. Box 37-7710, Chicago, Illinois 60637; 312-947-2014; $165.00

ROMANCE

ROMANCE turns sex education into a computer game where students tally their scoresheets according to their relationship decision making and their knowledge of contraception options. Designed for teenagers, this simple game takes students through a number of scenarios as they answer questions on reproductive health and contraception for a dating hotline. Students then move on to the "dating game" where they decide which, if any, contraceptive they would use on a series of dates, or whether they would choose abstinence. Because the simulation aims to educate, students must eventually choose each option available to them over the course of 36 dates to determine their chances of becoming pregnant with each contraceptive Because no contraceptive option, except abstinence, is 100 percent effective, students risk pregnancy, which may end in miscarriage or be carried to term. At this point, students must decide whether to terminate the pregnancy, keep the child or give it up for adoption. Each choice costs the students money, which translates into a loss of points on their scoresheet.

The graphics and sound effects in *ROMANCE* are simplistic, but the information imparted is vital. Although it may seem a bit tedious for students to have to make their contraceptive choices 36 times, it does allow users to see the probability of conceiving if precautions are not taken. *ROMANCE* would be useful to students in a sex education or family life course or available in a clinic setting.

MIDDLE AND HIGH SCHOOL LEVEL; IBM PC REQUIRED; 256K REQUIRED; CGA REQUIRED; USER'S MANUAL INCLUDED; NO PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS: CLINICAL REFERENCE SYSTEMS, LTD., 5613 DTC Parkway, Suite 350, Englewood, Colorado 80111; 303-220-1661; $49.50

BABYGAME

BABYGAME picks up where *ROMANCE* ends. For young people considering childbearing or those who neglect to take precautions against it, *BABYGAME* demonstrates the dollars and cents of raising and caring for a new child. As in *ROMANCE*, students tally their points on a scoresheet according to their income and expenses. In addition to determining whether they can financially afford to have a child, students must explore how the child would affect their lifestyles. On a pie chart, they evaluate how many hours would be available in a typical day for childcare, chores, work, school, homework, sleep and recreation. Players are also rated on how they handle unexpected situations, such as the child's sickness and irritability.

BABYGAME would make a useful supplement to any family life education course, as it factually presents the difficulties of teenage parenting.

MIDDLE AND HIGH SCHOOL LEVEL; IBM PC REQUIRED; 256K REQUIRED; CGA REQUIRED; USER'S MANUAL INCLUDED; NO PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDOR: CLINICAL REFERENCE SYSTEMS, LTD., 5613 DTC Parkway, Suite 350, Englewood, Colorado 80111; 303-220-1661; $49.50

BALANCE OF THE PLANET

Game designer Chris Crawford has created an ecology simulation which challenges the user to solve the earth's seemingly insurmountable environmental crises. As the United Nations High Commissioner on the Environment, the user wins points for bringing about environmentally beneficial steps, such as preserving biodiversity, but loses points for creating environmentally detrimental changes, such as more people dying from air pollution.

The student has the power to levy taxes on industry and grant subsidies to a variety of worthwhile activities, but is

graded on his or her ability to balance the world's economic well-being with the vitality of the earth's ecology.

Crawford's game succeeds in showing students the interrelatedness of 150 factors affecting environmental quality of life. High birth rates, resulting in escalating population growth, is part of Crawford's equation. Each of the 150 factors, from acid rain to water supply, is explained on different screens and in the manual.

To the first-time user, *Balance of the Planet*, seems like a frustrating exercise, since the environmental crisis can not be solved overnight, i.e., in the first several rounds of play. Even the user's beneficial changes will take a while to be felt.

Colorful graphics and a witty user's manual makes *Balance of the Planet* fun as well as educational. Although designed primarily for the home game user, *Balance of the Planet* would an appropriate tool for an ecology unit in a junior or senior high school science classroom.

SEVENTH GRADE THOUGH ADULT; IBM PC OR MACINTOSH PLUS, SE, SE/30, II, IIx, IIcx, or IIci REQUIRED; 512K REQUIRED (IBM), 1 MEGABYTE REQUIRED (MACINTOSH); CGA, EGA OR VGA REQUIRED ON IBM PC; USER'S MANUAL INCLUDED; NO PRINT CAPABILITY; 2 (3½") OR (5¼") DISKS INCLUDED; HARD DRIVE AND 1 DISK DRIVE REQUIRED

VENDOR: ACCOLADE, 550 S. Winchester Blvd., San Jose, California 95128; 408-985-1700; 800-245-7744; $49.95 + $3.50 shipping and handling

FAMSIM

FAMSIM, developed by Stephanie Bower at Indiana University Southeast, explores the impact of demographics on family structure by generating a probable sequence of family events under user-specified demographic conditions. The student provides the data for the average age of marriage for males and females, the percentage of males and females never married, whether the fertility is natural or controlled and whether the mortality rates are low, medium or high. From this information, the program displays a sequential family history, analyzes it and provides a graphic portrayal.

The user's manual includes a tutorial and worksheets for students to catalog their own generated family histories. Recommended for undergraduate and graduate-level students, *FAMSIM* is a useful simulation program for demographic instruction and research.

COLLEGE LEVEL; IBM PC REQUIRED; 256K REQUIRED; CGA, EGA, OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 2 (5¼") DISKS INCLUDED; 2 DISK DRIVES REQUIRED

VENDORS: NATIONAL COLLEGIATE SOFTWARE CLEARINGHOUSE, Duke University Press, 6697 College Station, Durham, North Carolina 27708; 919-684-6837; $42.50

MANRGY

Useful for high school biology, ecology and social studies classes, *MANRGY* is designed to promote students' understanding of how population growth, energy usage and environmental quality are all related. In this simulation, students are given a mythical land to serve as their "laboratory." Students can manipulate the ecological make-up of the land, as well as the inhabiting human societal type, population and population growth rate. The program then calculates corresponding information about the land's productivity, the population's food and non-food energy usage, and the population's environmental impact. Printer output is available to save these data. Because the five societal types correspond to the stages of human cultural evolution (hunter-gatherer, early agricultural, advanced agricultural, early industrial and advanced industrial), *MANRGY* could also be applied to studies of civilizations in anthropology and sociology courses.

The manual includes sample questions and exercises for the students, as well as a listing of chapters in various biology texts which provide students with background reading.

SECONDARY, COLLEGE LEVEL; RADIO SHACK TRS-80, MODEL I/II; APPLE II/II+/IIe, OR IBM PC REQUIRED; 32K (TRS-80); 48K (APPLE); 128K (IBM) REQUIRED; NO CGA, EGA, OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDOR: DIVERSIFIED EDUCATIONAL ENTERPRISES, INC., 725 Main Street, Lafayette, Indiana 47901; 317-742-2690; $49.95

POPGRO

Recommended for introductory biology and ecology classes, *POPGRO* is an effective teaching tool for demonstrating three classic models of population growth: an unlimited growth model (which considers initial population size, population growth rate and time); a limited growth model (which considers the previous variables plus carrying capacity); and a limited growth with time lag model (which considers the previous variable plus the time needed for a population to react to changing environmental conditions). Students manipulate the variables and observe the effects on the population through data tables, population vs. time graphs and $\log_e$(population) vs. time graphs. Because the program allows students to observe and compare three growth models, it is applicable to the study of plant and animal populations, as well as human populations.

In an attempt to show educators how to incorporate *POPGRO* into high school science curriculum, the manual lists chapters in several biology textbooks which can be used concurrently with *POPGRO*. Although the software has been adapted for use on IBM PCs, the visual image on the screen is not as clear as on the other listed computers.

SECONDARY, COLLEGE LEVEL; RADIO SHACK TRS-80, MODEL I/II; APPLE II/II+/IIe, OR IBM PC REQUIRED; 32K (TRS-80); 48K (APPLE), 128K (IBM) REQUIRED; NO CGA, EGA, OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS: DIVERSIFIED EDUCATIONAL ENTERPRISES, INC., 725 Main Street, Lafayette, Indiana 47901, 317-742-2690; $49.95

SIM CITY

Sim City combines education and entertainment to teach students the difficulties of city planning, from developing residential, industrial and commercial zones to balancing the town's budget. As "mayor," the student can control factors such as building, funding for police and fire departments, and the tax rate. The city will grow on its own, and a disaster menu including fires, floods, earthquakes, and even monster attacks can be used at any time to liven up the scenario, forcing the user to reallocate and rebuild. Public responses to taxes, crime, traffic, unemployment, housing costs, or pollution and resulting public opinion determine the user's approval rating.

Sim City comes with eight predetermined city scenarios to choose from, or the user can design a city entirely from scratch. The instructions on how to "grow" a city or repair one already damaged are very clear, and the lively graphics in the user's manual help to familiarize students with the screen and controls.

Sim City is challenging and educational for both students and adults. The software itself shows the effects of over- and underdevelopment and poor city planning as a whole through its graphics and citizen evaluations. Meanwhile, the user's manual includes a brief discussion of responsible planning, including an analysis of zoning, subdivision regulations, and environmental regulations. A short bibliography lists further references for urban planning research.

ELEMENTARY, SECONDARY, COLLEGE LEVEL; APPLE MACINTOSH IIX, IICX, SE30 REQUIRED; 512K (BLACK/WHITE); 2 MEGABITES (COLOR) REQUIRED; NO CGA, VGA OR EGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 2 (5¼") DISKS INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS: MAXIS SOFTWARE, 953 Mountain View Drive #113, Lafayette, California 94549; 415-376-6434; $49.95 (B/W), $79.95 (COLOR)

URBAN GROWTH SIMULATION

Urban Growth Simulation focuses on a small English market town with a base population of approximately 5,000 people in the year 1901. The student leaflets included with this package provide some information regarding growth and development patterns in an urban area, yet the software itself is rather unchallenging. The leaflets explain the difference between low and high density housing and the influence of topographical factors on settlement patterns. The software, however, is slow and offers little further information besides two additional maps representing actual population growth for the years 1941 and 1981.

ELEMENTARY, SECONDARY LEVEL; APPLE SERIES REQUIRED; 64K REQUIRED; NO CGA, VGA OR EGA REQUIRED; ONE SET OF STUDENT LEAFLETS INCLUDED; NO PRINT CAPABILITY; 1 (5¼") DISK INCLUDED; 1 DISK DRIVE REQUIRED

VENDOR: QUEUE, 562 Boston Avenue, Bridgeport, Connecticut 06610; 800-232-2224; 203-335-0908; $44.95

The following simulation was unavailable for review by ZPG, but can be ordered directly through the listed distributor:

SOCIAL AND ECONOMIC SIMULATION

This software contains three modules that demonstrate the limits to growth due to resource limitations, fertility rates and marketplace competition.

VENDOR: COMPRESS, Division of Science Book International, P.O. Box 102, Wentworth, New Hampshire 03282; 800-232-2224; $24.95

DATABASES

CENSUS DATA

The United States Department of Commerce's Bureau of the Census provides a wealth of population data on diskettes and CD-ROM. Most of the data is in ASCII delimited format and can be easily imported into most spreadsheet and database software programs. Most of the data disks are available in IBM 5.25" format and most cost $60.00 each.

A partial listing of data available includes: Census of Agriculture 1987: Advance File, MSA Estimates for Permit Authorized Construction: Monthly, MSA Estimates for Permit Authorized Construction: Annual, State Estimates for Permit Authorized Construction: Monthly, State Estimates for Permit Authorized Construction: Annual, Privately Owned Construction Authorized by Building Permits; County Business Patterns 1981-1986; County and City Data Book 1983; County and City Data Book 1988; Provisional Estimates of Households for Counties 1985; Industry and Product Classification 1982; Map Inventory 1980; 1986 Population Estimates for Subcounty Governmental Units; 1986 Per Capita Income Estimates for Subcounty Governmental Units; Quarterly Financial Report; State and Metropolitan Area Data Book 1986; and Value of New Construction Put in Place 1964-1985.

Two pieces of software are also available, *Population Estimates Software* ($84.00), which employs the Census Bureau's own algorithms for estimating population growth, and *Seasonal Adjustment Software* ($96.00).

An increasing amount of Census data is also available on CD-ROM diskettes. Most of the diskettes sell for $125.00 per disk. A partial listing of titles, includes: American Housing Survey 1985, County and City Data Book 1988, and 1987 Census of Agriculture: Geographic Area Series. Census Bureau press releases indicate that much of 1990 Census data will be available on CD-ROM.

SECONDARY, COLLEGE LEVEL; IBM PC REQUIRED; NO CGA, EGA, OR VGA REQUIRED; LIMITED DOCUMENTATION INCLUDED; PRINT CAPABILITY: N/A; VARIOUS (5¼") NUMBERS OF DISKS INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS: Data Access and Use Staff, Data User Services, Section, U.S. BUREAU OF THE CENSUS, Washington, D.C. 20233; 301-763-2074; 301-763-4794 (FAX); $60.00-$125.00

ELECTROMAP WORLD ATLAS

Electromap World Atlas is a menu-driven program containing 238 maps and hundreds of pages of text on 45 different topics. In addition to the regional and topographical maps, the program also includes statistical data on population growth and density, life expectancy, infant mortality and income per capita for each country. Users can also access a ranking of all countries according to these factors.

All of the maps are colorful, making the atlas fun to use for students of all ages. Although a mouse is not required, it is recommended for ease in accessing information.

ELEMENTARY, SECONDARY, COLLEGE LEVEL; IBM PC REQUIRED; 640K REQUIRED; EGA OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 5 (5¼") DISKS INCLUDED; 1 DISK DRIVE REQUIRED

VENDOR: ELECTROMAP, INC., P.O. Box 1153, Fayetteville, AR 72702; 800-336-6644; 501-442-2309; $129.00

GLOBAL DATA MANAGER

This spreadsheet software displays 185 variables for 192 countries and world regions. Data on population, food, energy, education, natural resources, economics, etc. can be stored, retrieved, added, sorted, compared, changed, plotted on a map and graphed. In addition to the standard variables found in most global databases, *Global Data Manager* also includes less accessible information such as AIDS cases reported for each country, TVs in use and access to safe water. Students of all ages will find *Global Data Manager* to be a useful research tool in analyzing global and national issues. The teacher's manual includes useful ideas for classroom applications of the system.

SECONDARY, COLLEGE LEVEL; IBM PC, MACINTOSH, APPLE II+, IIC, IIE, IIGS REQUIRED; 360K REQUIRED; NO CGA, EGA, OR VGA REQUIRED; USER'S MANUAL AND TEACHER'S MANUAL INCLUDED; PRINT CAPABILITY; 2 (5¼") DISKS INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS: WORLD GAME INSTITUTE, University City Science Center, 3508 Market Street, Philadelphia, Pennsylvania 19104; 215-387-0220; $125.00 (IBM, MACINTOSH); $75.00 (APPLE)

PC GLOBE and PC USA

PC Globe and *PC USA* are easy-to-use, menu-driven computerized atlases which are useful for the home and office, as well as the classroom.

PC Globe features maps of the world, selected regions and countries, displaying cities, elevations and other geographical points. The extensive database includes information for 177 countries, such as population, age distribution, literacy and urbanization, health statistics, economic and political data, travel information and more. Users are able to compare any of these data for individual countries or groups of countries. All data are displayed in attractive charts, bar graphs and pyramids. As an added bonus for geography students, the program displays distances between major cities and plots latitude and longitude points.

PC USA functions similarly to *PC Globe*, displaying maps and data for the 50 U.S. states, the District of Columbia and Puerto Rico. State data includes population and age distribution, statistics on health, education, crime, economics, politics and climate, as well as historical information and lists of tourist attractions.

Both *PC Globe* and *PC USA* would be assets to any geography class. The colorful graphics and extensive information can provide students of all ages with hours of fun, fascinating research.

ELEMENTARY, SECONDARY, COLLEGE LEVEL; IBM PC REQUIRED; 512K REQUIRED; CGA, EGA, OR VGA REQUIRED; USER'S MANUAL INCLUDED; PRINT CAPABILITY; 5 (5¼") (PC GLOBE), 3 (5¼") (PC USA) DISKS INCLUDED; 1 DISK DRIVE REQUIRED

VENDOR: PC GLOBE, INC., 4435 South Rural Road, Building 5, Suite 333, Tempe, Arizona 85282; 602-894-6866; $69.95 each

SOCIAL STUDIES TOOL KITS:

- **Our Nation**
- **Our World**

These two databases, developed by Great Lakes Software, include a wealth of statistical information which students can easily learn to manipulate for a variety of classroom applications. Each kit contains easy-to-use, menu-driven systems with clearly-written, comprehensive manuals.

Our World includes over 80 separate data files covering 151 countries. The three warehouse disks store information on population, vital statistics, climate, geography, education, religion, health, transportation, communications, government, economics and crime. Students are also able to add new files. The tool disks allow students to effectively manipulate the data in a variety of ways (viewing and printing files, ranking files, drawing bar graphs and maps, making correlations between files, correcting files, etc.). *Our World* is simple enough to allow middle school students

to explore the nations of the world, while high school students can apply the data to global studies, history, geography, demography and economics.

Our Nation contains 280 data files covering everything from population and climate to health and economics for each of the 50 states. It does not contain data for the District of Columbia. The tool disk functions the same as those in *Our World*. Like *Our World, Our Nation* has many applications to intermediate and secondary social studies curriculum.

ELEMENTARY, SECONDARY, COLLEGE LEVEL; APPLE II+, IIC, IIE, IIGS REQUIRED; 48K REQUIRED; NO CGA, EGA, OR VGA REQUIRED; TEACHER'S GUIDE, STUDENT HANDOUTS, AND MAPS (OUR WORLD) INCLUDED; PRINT CAPABILITY; 4 (5¼") (OUR NATION), 6 (5¼") (OUR WORLD) DISKS INCLUDED; 1 DISK DRIVE REQUIRED

VENDORS: TOM SNYDER PRODUCTIONS, 90 Sherman Street, Cambridge, Massachusetts 02140; 800-342-0236; $99.95, $190.00 FOR BOTH (YEARLY UPDATES $20.00)

The following data bases were unavailable for review by ZPG, but can be ordered directly through the listed distributors:

DATASETS

National Collegiate Software Clearinghouse produces a series of teaching datasets in a variety of formats. Among the titles offered are: City and County Data Book 1983 State Aggregates, City and County Data Book 1988 Counties, City and County Data Book 1988 Cities, City and County Data Book 1988 States, Nations of the World Database, State and Metropolitan Area Data Book 1986 Cities and States, and State Data Disk.

VENDOR: NATIONAL COLLEGIATE SOFTWARE CLEARINGHOUSE, North Carolina State University, School of Humanities and Social Sciences, Box 8101, Raleigh, North Carolina 27695; 919-684-2173; $25.00 - $100.00

WORLD DEVELOPMENT INDICATORS

World Development Indicators consists of economic and social data for countries of the world as reported in the World Bank's annual World Development Report. Available in LOTUS 1-2-3 or PRN format.

VENDOR: WORLD BANK BOOKSTORE, 701 Eighteenth St., NW, Washington, DC 20433; 202-473-2941; $95.00

PROBLEM-SOLVING GAMES

DECISIONS, DECISIONS

- **Immigration: Maintaining the Open Door**
- **Urbanization: The Growth of Cities**

The *Decisions, Decisions* series is unlike all the other software reviewed in this publication. It is designed so that an entire class can benefit from the use of one computer, with the teacher acting as discussion leader and the computer serving as a teacher's aid.

Each *Decisions, Decisions* software package presents a "You Are There" situation requiring students to examine options, make a series of decisions, and experience the consequences of their choices. Along the way, "advisors" (found in the students' booklets) express various points of view and refer to historical situations and current policies that may shed light on their dilemmas. Students must consider all information and opinions offered and then reach consensus on a course of action. The format stimulates lively, enlightening discussions as students hone their thinking and group process skills.

Immigration: Maintaining the Open Door places the students in the role of a U.S. President faced with responding to a large influx of uninvited refugees shortly before the electoral primaries. *Urbanization: The Growth of Cities* puts students in the role of small-town mayor confronting the prospect of sudden rapid growth when a valuable resource is discovered in the area.

There are no easy answers in either of these scenarios, but since decisions are faced one at a time, the teacher can control both the focus and the pace of the lessons. It is stimulating, educational, and fun to work through the situations presented, and we think *Decisions, Decisions* is an excellent tool for teachers.

ELEMENTARY, SECONDARY LEVEL; APPLE II SERIES, IBM PC, PCJR, TANDY 1000 REQUIRED; 64K (APPLE); 512K IBM REQUIRED; NO CGA, EGA, OR VGA REQUIRED; INSTRUCTIONS, LESSON PLANS AND STUDENT WORKSHEETS INCLUDED; PRINT CAPABILITY; 2 (5¼") DISKS INCLUDED; 1 DISK DRIVE REQUIRED

VENDOR: TOM SNYDER PRODUCTIONS, 90 Sherman Street, Cambridge, Massachusetts 02140; 800-342-0236; $119.95 EACH

ONLINE

CENDATA

Cendata offers current economic and demographic data for the United States, as well as demographic data for more than 200 countries. Monthly economic indicators released by the Census Bureau are available on *Cendata* within minutes after their release. *Cendata* also provides other data on manufacturing, business, foreign trade, construction, governments, and agriculture. Monthly time series data on key national economic indicators are also on the database. Demographic data available include current household per capita income and population estimates for all states, metropolitan statistical areas and counties, as well as national-level data on topics such as registration and voting, child care, unemployment, and school enrollment. *Cendata* also offers demographic/economic profiles for each state and metropolitan statistical area, and annual business data at the county level.

Users can access *Cendata* by subscribing to either CompuServe or DIALOG, two full-function online services. *Cendata* is a simple menu-driven system which can be used with relative ease. Users accessing via DIALOG have search capabilities but users accessing via CompuServe do not. While the information contained is not massive, the information is quite current and updated monthly. It is anticipated that much of the 1990 Census data will be available on *Cendata*.

VENDORS:

CENDATA PROGRAM, Data User Services Division, Bureau of the Census, Washington, D.C. 20233; 301-763-2074

COMPUSERVE INFORMATION SERVICES, INC., 500 Arlington Centre Boulevard, Columbus, Ohio 43220; 800-848-8990; 614-457-8650

DIALOG INFORMATION SERVICE, INC., 3460 Hillview Avenue, Palo Alto, California 94304; 800-334-2564; 415-858-3810

POPLINE (POPulation information onLINE)

Popline contains more than 170,000 citations (approximately 400 MB) from the worldwide literature on population and family planning. *Popline* is maintained by the Population Information Program of Johns Hopkins University in collaboration with Columbia University, Population Index, Princeton University, and the University of North Carolina at Chapel Hill, and funded primarily by the United States Agency for International Development.

Popline presents citations relating to fertility, contraception, family planning, demography, and related health, law, and policy issues. *Popline* includes citations from all types of literature; about 30% of the records represent difficult-to-obtain, unpublished documents (full-text copies of most of the documents in *Popline* are available). The majority of items date from 1970 with selected citations dating back to 1886. Ten percent of the citations are from non-English language sources, but all are in English. *Popline* is updated monthly with approximately 10,000 records added annually. *Popline* is also part of the MEDLARS system of the National Library of Medicine, which includes MEDLINE and about a dozen other medical information databases.

A CD-ROM version of *Popline* is funded by the United Nations Population Fund (UNFPA). Utilizing the CD-ROM data compression techniques, the entire *Popline* database is reduced to one disk which is updated every four months. The CD-ROM system requires IBM compatible computers with 512K RAM and PC DOS or MS DOS version 2.1 or higher, two disk drives, and a CD-ROM drive ($600.00 to $1,500.00).

The MEDLARS system itself is not very user-friendly and training is a significant factor. Once in *Popline*, the system is fairly straightforward with understandable menus and help screens.

VENDORS:

POPULATION INFORMATION PROGRAM, Center for Communications Programs, The Johns Hopkins University, 527 St. Paul Place, Baltimore, Maryland 21202; 301-659-6341

SILVERPLATTER INFORMATION, INC., 37 Walnut Street, Wellesley Hills, Massachusetts 02181; 617-235-1715

There is no charge for signing up to MEDLARS to get *Popline*. The charge for using MEDLARS varies from approximately $22.00 per hour during prime time (daylight) to $15.00 per hour for non-prime time.

POPLAC

POPLAC is a nonprofit professional association of microcomputer users interested in population activities. *POPLAC* has over five hundred members worldwide. POPLAC, c/o Social Development Center, 1313 East 60th Street, Chicago, Illinois 60637; 312-947-2010; $25.00 PER YEAR

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About Zero Population Growth

Zero Population Growth, Inc. is a Washington D.C. based nonprofit membership organization. Founded in 1968, ZPG works to achieve a sustainable balance of people, resources and the environment, both in the United States and worldwide.

- ZPG's highly innovative educational programs bring population education to thousands of young people in our nation's classrooms.
- ZPG's media and public information programs build public awareness about population concerns.
- ZPG's citizen action efforts help Americans get involved in local and national policy initiatives related to key population and environmental issues.

ZPG's Population Education Program

Since 1975, ZPG has provided quality population education training and teaching materials for educators.

Training workshops are offered throughout the United States for teachers of grades K-12 and students of education.

Teaching kits and shorter teaching units have been developed for all grade levels.

For further information, contact the Director of Population Education, ZPG, Inc., 1400 Sixteenth Street, N.W. Suite 320, Washington. D.C. 20036.

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